ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENTOFBIOMEDICAL ENGINEERING

Action Taken Report
Board of Studies Meeting for AY 2021-22

August 26 and 28, 2021

Agenda no 1: Approval/suggestion on **third semester** curriculum and syllabi

Proposition:

- To maintain the **uniformity** and to **make the curriculum of 160 credits** it was proposed to change the credits of theory courses from 4 to 3 (Last column: highlighted in grey colour).
- To maintain the uniformity across all programs, **HSSM –IV (ECONOMICS FOR ENGINEERS)** (Last row: highlighted in grey colour) was proposed to be offered to BTech Biomedical Engineering students in semester III.
- In Electronics Lab, the **portion of digital electronics lab was missing**, which was mandatory to be included.

Subject Name (Mandatory)	Revised Course Code	Total Credit (Previous)	Total Credit (Proposed)	Semester (Mandatory)	Credit Point / Marks (Previous)	Proposed credit
Transform Calculus & Special Functions	MTH11526	26	25	Semester 3	4	3
Analog and Digital Electronics	BME11001			Semester 3	4	3
Anatomy & Physiology	BME11002			Semester 3	4	3
Signals and Network Analysis	BME11003			Semester 3	4	3
MATLAB & Simulink	BME12004			Semester 3	2	2
Signals and Network Analysis Lab	BME12005			Semester 3	2	2
Electronics Lab	BME12006			Semester 3	2	2
Capstone Project-III	GEE14005			Semester 3	1	1
Community Service	SOC14100			Semester 3	1	1
Venture Ideation	EIC11001			Semester 3	2	2
HSSM –IV (ECONOMICS FOR ENGINEERS)	ECO11505			Semester 3	3	3

Resolution: The board accepted and approved the overall change in credits,modification of Electronics Lab syllabus, and addition of HSSM –IVto the Semester III course Structure.

Agenda no 2: Approval/suggestion on **restructured curriculum** of BTech Biomedical engineering (**164 credits**).

Proposition:

- To maintain the uniformity and to **make the curriculum of 160 credits** it was proposed to change the overall credits from 175 to 160. Also some of the topics and courses were required to be included/ modified **as per GATE syllabus**.

- **First year curriculum was completely different** from that commonly offered to all SOET streams

The BoS members proposed the following points on curriculum:

Course name	Suggestions by BoS members	Action taken
First year curriculum	Common curriculum will be offered	Modified accordingly
Engineering Mechanics	Consider an "Engineering Mechanics-II" course for a later semester, where additional machine theory principles can be covered, such as lever mechanisms, gears, cams, pulleys etc.	Will be offered in the "Engineering workshop" course.
Second year curriculum	It would be beneficial for students to cover an introductory "Artificial Intelligence" course before the end of 2nd year. Suggested topics to include – Fundamental understanding of machine learning, computer vision, neural networks, big data applications. Understanding of real-world medical device applications, such as IOT, surgical planning, robotic surgery, navigated surgery, smart sensors etc.	Will be offered as **value-added course** in Semester VI as "AI in Healthcare"
Basic Clinical Science	● Syllabus should be completely changed as it is completely similar to Biomedical Instrumentation. ● Medical Biochemistry and Microbiology syllabus should be included. ● The name of the course will remain same. ● Basic Clinical Science should be in the semester IV	Included in semester IV Syllabus will be modified accordingly
Biomechanics	Should be taught in semester V in third year, so that the student will have more understanding of the subject	Both theory and lab courses have been replaced to semester V
Biomaterials	Introduce as per requirement of GATE syllabus as core course	Included in Semester IV
Elective Course –general comment	One elective that would be very beneficial for employability is "Manufacturing processes", which will cover fundamental understanding of machining, sheet metal, molding techniques, additive manufacturing techniques (plastic/metal), welding techniques, finishing processes, design for manufacturability &inspectability.	Will be offered as **Value-added course** in Semester III as "Digital design & Manufacturing processes"
Elective Course –general comment	An introductory course on "Regulatory processes of biomedical industry" containing an understanding of ISO 13485, ISO 14971, FDA CFR-21 key requirements, ASTM physical, material and	Will be offered as workshop by industry expert

	computational test standards for medical devices will be beneficial for either sem-7 or sem-8.	
Elective Course: Bio-materials and Prosthetics	Biomaterials have already been taught in Biomaterials. Should be merged with Biomaterials. Prosthetics might be better clubbed under "biomedical devices/biomedical instrumentation"	Merged and will be offered at semester IV Prosthetics will be clubbed with Biomedical Instrumentation II
Elective Course: Rehabcare Engineering	Should be mandatory elective	Will be implemented at Semester VI
Elective Course: Molecular Biology	Can be removed. The basic can be taught in the first unit of tissue engineering.	Removed
Elective: Hospital Management	If possible, merge with "Industrial Management"	Will be offered as workshop by industry expert
Open Elective Course: Machine Learning/Robotics and artificial intelligence	• Suggest splitting into an elective "AI" (this will contain machine learning, computer vision etc) • Another elective "robotics" (this will contain fundamentals of Motor design principles, degrees of freedom of joints, embedded design basics, exposure to Labview or other similar software, systems engineering, image registration, computer-assisted surgery etc.)	Machine Learning will be offered as "AI-ML". Robotics will be offered as **value added course semester** V as "IOT & Robotics"

Resolution: The board accepted and approved the overall restructuring the curriculum to 164 credits.

Agenda no 3: Approval/suggestion on syllabi to be offered in the curriculum
Proposition: The BoS members proposed the following points on syllabus:

Course name	**Suggestions by BoS members**	**Action taken**
Programming Lab	To include Low-level programming language such as C, C++	Will be modified
Engineering Drawing and CAD	To introduce to ProE/Creo or Solidworks here; CAD feature types such as 'extrude', 'revolve', 'sweep', 'blend', 'draft', 'round', 'chamfer'	FUSION 360used in AU has all these features
Design Thinking	To incorporate Empathic design principles, Voice of customer (VOC) techniques and tools, New Product Development (NPD) process, that are routinely used in industrial R&D organizations.	Will be modified
Engineering workshop	To provide the knowledge of Geometric Dimensioning & Tolerancing, per ASME Y14.5-2009 standard. It will strengthen employability.	Can be offered as workshop by Industrial Expert
Anatomy & Physiology	Consider focusing on areas relevant for major industry sectors – neuro anatomy, hip, knee, spine, shoulder, foot/ankle, blood, heart, lungs	Course faculty has been requested to focus on these areas
Biomechanics	Consider more detailed coverage of hip, knee, shoulder, spine joints, as these cover a lion's share of the	Will be modified

	orthopedic medical device industry. Additional topics to include are Wolff's law, hip joint reaction force (JRF), hip/knee range of motion (ROM), knee degrees of freedom, constraint vs compliance balance	
Biomechanics Lab	Suggest including hip stem FEA model, to illustrate hip biomechanics and implant design philosophy.	Will be modified
Capstone Project	There should not be any fixed syllabus for Capstone Projects	Will be discussed in Academic Council
Engineering Drawing and "CAD"	Engineering Drawing and "CAD" should be the subject name. No specific mention about CAD practice in the syllabus.	Will be modified
Environmental Science	A module containing mode of recycling can be incorporated in Environmental Science.	Course coordinator will be asked to cover this topic
MATLAB and SIMULINK	MATLAB and SIMULINK should be changed as "Programming for Biomedical Engineers". Its contents can be altered to incorporate basic programming in MATLAB, SIMULNK, LABView or any other relevant software.	Will be asked for approval in Academic Council
Signal and Network lab	Signal and Network lab does not need introduction to MATLAB portion.	Will be modified accordingly
Biomechanics	● Strength of Materials is not covered. So, it can be incorporated as a module in Biomechanics. ● There is no text or reference book from Bio-fluid Mechanics. It should be incorporated. ● The FEA book can be removed from the list. ● Consider possible reduction in Biofluid Mechanics module in Biomechanics, as there is a separate elective subject on Bio-fluid Mechanics.	Will be included and modified
Biomechanics lab	● Cost effective Biomechanics lab with all necessary components is required. ● Mechanical testing device can be incorporated in the Biomechanics lab.	Will be implemented
Bioinstrumentation lab	● Study of load cell or torque measurement does not really belong to Bioinstrumentation lab. ● Diathermy, audiometry etc. can be incorporated in Biomedical Instrumentation lab.	Will be modified

Digital Image Processing	• Module 4 first part of Digital Image Processing is redundant and can be removed. • Module 4 second part of Digital Image Processing should be moved to become first part of Digital Image Processing. • Image storage in PACS, should be introduced	Will be modified
Hospital management	• Consider hospital visit in. • Consider hospital visit for Imaging Systems.	Will be arranged
Biomedical Instrumentation-II	Bioinstrumentation-II content can be replaced with some of the content from Bioinstrumentation-I.	Will be modified
Bio-telemedicine	The name Telemedicine should be used, instead of Bio-telemedicine.	Changed
Electives – General Comments	Some topics can be thought of as electives or can be incorporated in other subjects, such as: • Locomotion of robotic and biological systems • Machine Learning techniques • Microfluidics and BioMEMS • Biofabrication including 3D printing • FEA (possibly as open course) • CFD (possibly as open course) • Surgical Techniques and Robotic Surgery	Will be implemented as per the availability of the subject expert
Digital Signal Processing	The name of the course should be changed to "Biomedical Signal acquisition & processing" Include 3-4 sessions on the characteristics and how the biomedical signals are generated. Also include the application aspect.	Modified
Modelling and simulation of biomedical systems	Data mining, data exploration and modeling should be included	Will be modified
Biomedical Instrumentation-II	1-2 lectures of Telemedicine should be included	Will be included

Resolution: The above-listed suggestions by BoS members will be implemented after thorough modification of syllabus fourth semester onwards.

The meeting concluded with a vote of thanks by Dean of SOET.

Issued By

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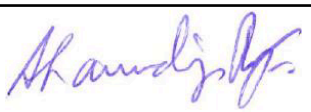
Date: 06.09.2021

Approved by: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	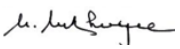	
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